Ping Client Test

Page application

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This application page aids in testing IP connectivity and response. It sends the usual ICMP Echo Request message to the given target IP address and displays the response. Any node supporting IP is likely to include such a ping client.

Page layout

```
     I PING/ECHO/UDP   08/09/92 0733
*PING<131.225.129.120>   N<   2>   target IP addr, #times
SIZE<  64>       0  PERIOD<  15>   data size, period in 15 Hz
REPLY -12     T=   5 MS  N=   2    elapsed time, #replies
0000 2767 0011 0001 089C 0A0B      data received
0C0D 0E0F 1011 1213 1415 1617
1819 1A1B 1C1D 1E1F 2021 2223
2425 2627 2829 2A2B 2C2D 2E2F
3031 3233 3435 3637 3839 3A3B
3C3D 3E3F
```

Operation

Enter the target IP address and #times to execute on the second line. As each request message is sent, the sequence field in the ICMP header is incremented.

Enter the data size of the request message, including the 8-byte ICMP header size, on the third line. A size value less than 12 is changed to the default value of 64, as a minimum of 10 bytes is needed for the ICMP header and the time words. The maximum value allowed for the data size is about 9000 bytes, consistent with the largest IP datagram supported by the local station system.

Enter the period in 15 Hz cycles at the right of the third line. (If the period is 15, test requests will be sent at 1 Hz.) A period value of zero is a special case that means “send the next request as soon as a reply is received from the last request.” This allows for testing much faster than 15 Hz for target nodes that respond quickly.

An interrupt anywhere on the second or third lines initiates the test sequence. (The exception is the area of the 4 characters of PING, where an interrupt is used to select the UDP Echo mode described below.) Requests are sent to the target node using ICMPSend, according to the period specified, where the identification field (third word of the ICMP header) is set to the portId returned from UDPOpen. (As this program was partly writ ten to test the UDP layer routines, a new UDPOpen is made for each new test sequence.) The PING characters are hi-lighted to show activity for the duration of the test sequence, after which the hi-lighting is removed. Another interrupt during this activity will abort the test sequence. Leaving the page will also abort the test, of course.

When a reply is received, details of the response are shown on the following lines. The field after REPLY is a status return code from the call to UDPRead. An ICMP Echo Reply message is passed to the page application by the system’s ICMP processing that interprets the identifier word of the ICMP header as a portId, which via the net connect

table NETCT leads to the message queue that was created by UDPOpen. It usually shows the value "–12" that means the message queue is empty, which is expected after all messages have been read from it.

After the "T=" is the response time in ms. When the Echo Request message is sent to the target IP address, part of the data is used to hold a time value, so that when the reply is received, the elapsed time can be computed. This simplifies the processing of elapsed time in cases where replies are tardy such that multiple requests are outstanding.

The number of replies received since the last request is shown by the value after "N=". The data received is shown on the following (up to 8) lines. The first four words are the ICMP header, followed by the time word. The other words are a fixed increasing pattern. Expect to see the sequence number in the fourth word increment for each new reply. The time word can be also be seen to change.

UDP Echo option

The same page can also serve as a UDP Echo client. Select this option by an interrupt on the word PING, which will cause it to change to ECHO. (Interrupt again to change back to PING mode.) In this case, a UDP message is sent (via UDPWrite) to the standard UDP echo port (7) of the target IP node. The UDP header is not included in the reply message displayed in this case. The fourth word of the data is used as a sequence# and the fifth word is the time. The rest of the data words are the fixed pattern. A UDP Echo server returns the same UDP datagram in response to any UDP datagram received. For the local stations, the local application ECHO provides this function. It can also serve as a simple example of writing a UDP server program for the local station.

Usefulness

This page was invaluable during testing of the implementation of IP and UDP for the local stations. When used in conjunction with the network frames page, usually accessible via Page F on the local station consoles, it allows viewing of the complete frames that are sent or received by the local station. IP fragments can also be examined, along with the timing of all frames to 1 ms resolution. See the document "Network Frames Page" for more details.

Broadcast

It is possible to issue a broadcast ping message if any routers along the path permit it. When using a target IP address such as 131.225.129.255 to do this, all replies will be displayed, which at last count added up to 63. Depending upon the token ring network configuration, some replies may be lost due to congestion at the bridges. The local station system can get very busy showing the replies, and the response time displayed will include a lot of this display updating. Also, as the ARP table is filled by any IP frame received, it can get filled up very quickly. As a result, while not disallowed, the use of broadcast ping is generally discouraged.